

WORLD



Date 1/1/2023

Page 1

- ① Hot springs
- ② Cold mountains
- ③ Deciduous forests
- ④ Oceans
- ⑤ Fresh water lakes
- ⑥ Deserts

- Life is found in extraordinary habitats

- ① Ecological conflict
- ② Cooperation among members of population makes us deeply what is life
- ③ Molecular traffic inside a cell reflects on among population of community

★ Ernest Mayr - Darwin of 20th century

- ② Gave def. of biological species

TANISHA SACHAN

AIR 1747

- What is living?
- interact → growth
- Reproduction
- ability to sense environment → mount a suitable response
- emergence
- self organ. → metabolism
- self → ability to self replicate

ALL ORGANISMS GROW →

- ① Increase in mass
- ② Increase in number.

→ twin charact. of Growth.

Multicellular org.

Growth by cell division

Unicellular org.

Growth by cell division

★ Plants → Growth by cell division occurs continuously throughout life span

Animals → Growth seen upto a certain age.

observed in vitro by counting no. of cells

★ Cell division → occurs "certain" times → to replace lost cells.

★ Majority of higher animals → plants] → Growth] mutually exclusive events.

★ One must remember, ↑ in body mass = growth. if we take this as a criterion

Accumulation of material on the surface of growth

This kind

mountains

Non living

boulders

objects grow

sand mounds

• In living org - growth is from inside

Growth cannot be taken as defining property of living org.

conditions under which it can be observed in all living beings have to be explained

Then, it's a charact. of living system.

★ A dead organism does not grow.

REPRODUCTION

- In multicellular org. → Production of progeny more or less similar to those of parents.

Invariably we refer to sex. reproduction

Implicitly

Asexual Reprod.

Fungi

Fragmentation, proto

fil. algae of moss

Fungi

Multiply

spread easily due to

millions of spores

Budding

lowe

root, hyd

Planaria

True reg. generation

Unicellular Org. → Bact. → Unicellular algae → Amoeba

Reproduction synonymous with growth. i.e. ↑ in no. of Cells.

Don't reproduce → sterile workers, infertile hives, an couple.

Hence, repr. also cannot be an inclusive defining characteristic of living org.

* NO, non-living object is capable of reproducing by its off

(defining feature of a living org.)

METABOLISM → All living org - made of chemicals

AIR 1747

small belonging to various

Big classes of function sizes

Chemical react.

INCERT THREAD NOTES

Metabolic react.

These conversion

Constantly being made

and changed into some other biomolecules.

• 1000s of metabolic reactions occurring simultaneously inside all living organism

• All plants, animals, fungi, microbes → exhibits metabolism

{ Sum total of all the chemical reactions occurring in body }

* No non-living object exhibits metabolism

METABOLISM

* An isolated metabolic reaction(s) outside the body of an organism, performed in a test tube is neither living nor non-living.

* demonstrated outside the body in cell free systems.

Isolated metabolic rns in vitro are not living things but surely living rns.

* Cellular Organisation of the body is defining feature of life forms.

CONSCIOUSNESS → most obvious feature of all living organism is

We sense envir. through our sense organs.

ability to sense the environment stimuli

other organism

physical, chemical, Biological

Plants - respond to External factors → light, water, temp, pollutants

All org. from prot → eukary. (most complex)

can sense & respond to environmental cues

* Photoperiod affects reproduction in seasonal breeders both plants & animals.

All org. regulates chemical entering the body.

* All org. → "aware" of surrounding

This is consciousness

* Human being → "aware" of himself

Human beings - more difficult to define living state

↪ Patient is

otherwise

brain dead

& has no

self-consciousness

lungs

Virtually supported

by machines which

replace

Coma people

Living phenomena — due to underlying interactions!

Properties of tissue not in the constituent cells but arise as a **interaction among the cells.**

Properties of cellular or organelles not present in molecular constituents of organelle but due to **interaction among them.**

results in

- Emergent properties at a higher level of organization.
- * This phenomena is true in hierarchy of organizational complexity at all levels.

Thus

- Living org. capable of **self replicating**
evolving
self regulating
- interactive systems.** capable of responding to **external stimuli.**

TANISHA SACHAN

AIR 1747

- Biology — story of life on earth
Story of evolution of living org. on earth.

All living org.
present ← ↓ → future

linked to one another
by sharing

common genetic material

but to varying degree

Page _____

Diversity in Liv. Beings.

born 2 inspire

Date 1/1

As we explore → new areas
and even
old ones
new org are
continuously
being identified.

TANISHA SACHAN

AIR 1747

NCERT THREAD NOTES

Area of observation & Variety of organisms

* No. of species known & described range
1.7 - 1.8 million

Biodiversity - Number & Types of organisms present
on earth.

Nomenclature - Standardizing the naming of living organisms.

possible only when

Identification - Description of organisms correctly and we know to what org. the name is attached to.

ICBN - International Code for Botanical Nomenclature
CZN " " " Zoological Nomenclature

Scientific name ensures that each org. has only one name.

Naming System given by Carolus Linnaeus  Binomial Nomenclature

Universal Rules Of Nomenclature:

1. Biological names - Generally in Latin & written in italics

(1) Latinised
OR
(2) derived from Latin

irrespective of their origin.

2. Biological name  First word → Genus

 Second word → Specific epithet

3. Both the words - in Biological name

when handwritten  separately underlined

Latin origin

OR  printed in italics

4. First word - genus → starts with capital letter

Second word - Specific epithet → starts with small letter

TANISHA SACHAN

AIR 1747

* Name of author → appears after Specific Epithet

→ written in abbreviated form

→ *Mangifera indica Linn*  indicates species was described by Linn.

TAXA  can indicate categories at very diff levels.

Eg. mammals (Class)

→ animals (K)

→ dogs (Canidae - Family)

Classification - process by which living things are grouped into convenient categories.

Scientific terms for categories

TAXA

① Ecological

② Ext & Int. structure

information of organism

③ Structure of cell

④ Development process

← Basis of Modern Taxonomy

unique to

① Characterisation

② Identification

③ Classification

④ Nomenclature

process of

Based on characteristics all living

organism can be classified

on

into different taxa.

Human beings wanted to know more about org.  w.r.t their own use.

① Human beings - found sources for their BASIC NEEDS  food  clothing  shelter.

* Earliest Classification - based on uses of various organisms.

They also wanted to know relationship among organisms.

Systematics → Latin origin  Linnaeus - *Systema Naturae*

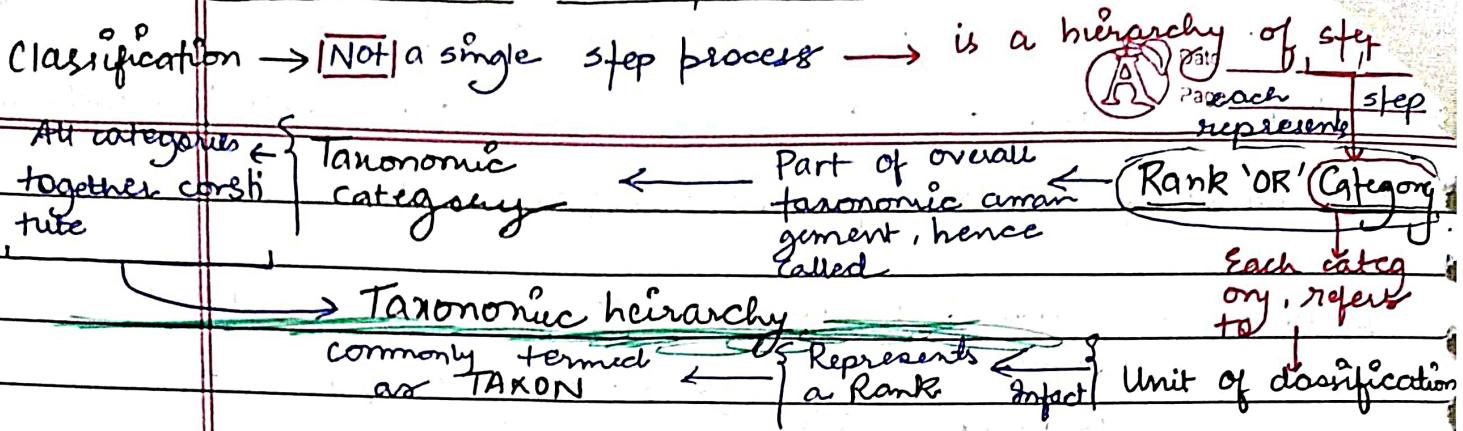
Systematic arrangement of organisms.

1) Identification  included in Systematics  takes into account evolutionary relationships b/w organisms

2) Nomenclature  included in Systematics  evolutionary relationships b/w organisms

3) Classification  included in Systematics  evolutionary relationships b/w organisms

TAXONOMIC CATEGORIES



Insects → represents → a grp of organisms sharing common feature like 3 pairs of jointed legs.

Thus given

Rank or Category

Thus, insects are recognizable

concrete objects that can be classified

* Grp represents category denotes Rank/Taxon represents Unit of classif.

* These taxonomic grp/ category are distinct biological entities & not merely morphological aggregates. Imp

TANISHA SACHAN

Taxonomic Studies → of all known organism → led to development of

[Species - lowest category in both plants & animals.]

common categories

Kingdom

Phylum

Division

NCERT THREAD NOTES

Basic Requirement → Knowledge of characters of an individual or group of organisms → To classify them

Amp

Identifying similarities & dissimilarities among the individuals of some kind of organisms as well as of other kinds of organisms.

SPECIES

- Grp of individuals → fundamental similarities
- One should be able to distinguish one species from another based on distinct morphological difference.
- Each genus may have one or more specific epithets.
- Morphological similarities but representing diff organisms

* Panthera → lion
→ panther → leopard
→ tiger → tiger

* Solanum → tuberosum (potato)
→ melongena (eggplant)
→ nigrum (tomato)

* Homo → sapiens

GENUS

compose → Grp of related species which has more chr. common in comparison to species to other genera.

aggregates of closely related species

Potato & Brinjal → same genus (Solanum)

Lion
tiger
leopard → same genus

Felis - genera of cats.

Family → grp of related genera with still less no. of similarities as compared to
 → Characterised on Veg. features of plant species Reprod. features of plant species genus species
Alatura, Pteraria, Solanum → Family - solanaceae Canidae - dog family
 Date: Panthera Page Felidae
Felis

ORDER → Assemblage of families which exhibit a few similar chr.

Plant families → Convolvulaceae Solanaceae → Order: polyphyletic (based on oral chr)
 are less in no as compared to diff. genera included in a family
Felidae order Carnivora
Canidae

CLASS → includes related orders

Mammalia
class.

Primates
order.

Carnivora

monkey
gorilla
gibbon
tiger
cat
dog

PHYLUM fishes amphibians Reptiles birds Mammals → ectotherm
 in case of plants → Chlorophyll
Division → plantae - plants → dorsal hollows
KINGDOM → Animalia - animals → neural system

TANISHA SACHAN

AIR 1747

NCERT THREAD NOTES

K
P/D

C

O
F

G

S

lower the taxa, more the characteristic that the members share within taxa.

↑ difficulty of determining the relationship to other taxa at same level.

↑ problem of classification
more complex

Taxonomists have developed sub-categories to facilitate more solid & scientific placement of various taxa.

common name	Bio-name	Gr	F	O	C	P/D
Man	Homo sapiens	Homo	Hominidae	Primate	Mammalia	Chord.

Housefly	Musca Domestica	Musca	Muscidae	Diptera	Insecta	Anthrop.
----------	-----------------	-------	----------	---------	---------	----------

Mango	Mangifera India	Mangifera	Anacardiaceae	Sapindales	Dicotyledonae	Angios.
-------	-----------------	-----------	---------------	------------	---------------	---------

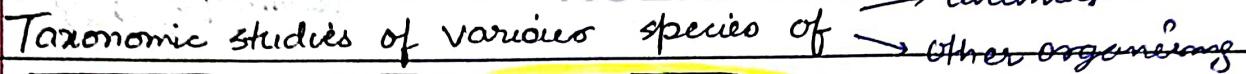
Wheat	Triticum aestivum	Triticum	Poaceae	Poales	Monocotyledonae	Angios.
-------	-------------------	----------	---------	--------	-----------------	---------

Genus → Tribe → Subfamily

~~TAXONOMICAL AIDS~~

AIR 1747

NCERT THREAD NOTES

Taxonomic studies of various species of 

In general knowing our 



Industry
Forestry
C.I.F.A.

Forestry
Agriculture

Agriculture

other organisms

plants
animals

other organisms

useful in

These studies would require 

intensive laboratory

requires

field studies

The collection of actual specimens of 

prime source of taxonomic studies.

plants
animals

is essential & is a

These are also fundamental to studies & ~~essential~~ for training in ~~systematics~~

Used for classification of an organism, & information gathered is also stored along with the specimens.

In some cases, specimens 

Biologists have established 

procedures, techniques, to store & preserve info. as well as specimens.

On sheets 

Preserved

These sheets are arranged 

accⁿ to

Universally accepted system of classification.

These specimens 

with description on herbarium sheets, 

"storehouse" or "repository" for future use 

become

collector's name

Label 

Date of collection 

Place of collection 

English name 

Local name 

Botanical name 

Herbaria serve as

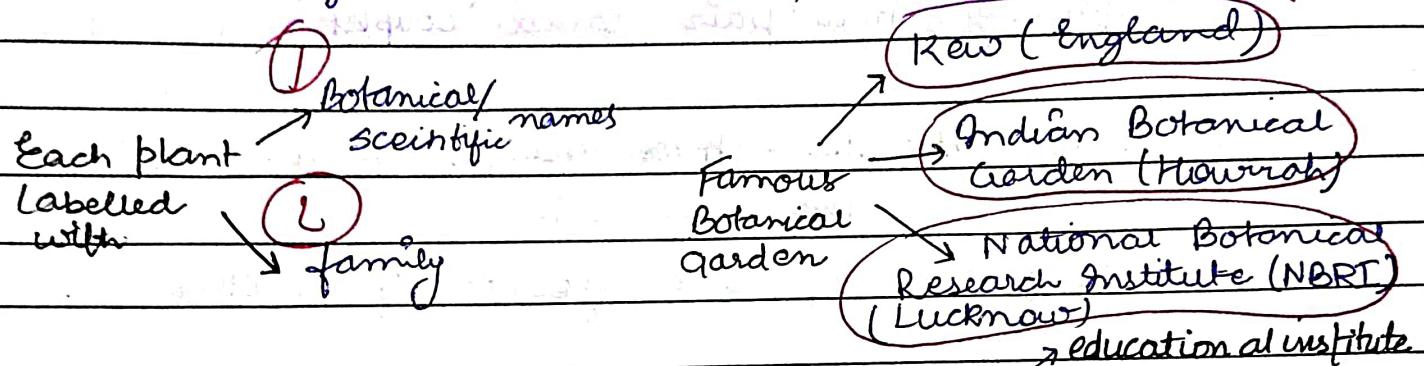
quick referal systems in

taxonomical studies

BOTANICAL GARDENS

Specialised Garden → have collection of → living plants for reference.

Plant species grown here are for - identification purpose.



MUSEUMS

• Biological museum set up in schools & colleges

Have collection → Preserved

plant specimen
Animal specimen

for ① Study &
② Reference

Specimen $\xrightarrow{\text{preserved in}}$ Jars/Containers $\xrightarrow{\text{in}}$ Preservative soln.

* Plant & Animal specimen may also be preserved as [dry specimen].*

Insects → Preserved in insect boxes after

- ① Collected
- ② Killing
- ③ Pinning

Larger Animals $\xrightarrow{\text{Birds}}$ $\xrightarrow{\text{mammals}}$ usually ① stuffed & ② preserved.

* Museums often have collections of skeletons of animals too.

ZOOLOGICAL PARKS → places → Wild animals are kept

enable us to learn about their

food habits Behaviour

TANISHA SACHAN

AIR 1747

NCERT THREAD NOTES

All animals in zoo → provided with → conditions similar to their natural habitat.

• Children love visiting there.

Commonly called → Zoos

generally, analytical in nature



Date _____

Page _____

KEYS

- Taxonomical Aid
- Used for - identification of plants & animals both
- Based on - similarities & dissimilarities

TANISHA SACHAN

Keys are based on → contrasting characters

↓ AIR 1747

Generally, in a pair called 'couplet'.

NCERT THREAD NOTES

- It represents the - Choice made b/w 2 opposite options
this ↓ results in

Acceptance of only one & rejection of the other.

- Each statement in a key - Lead

~~Separate taxonomic keys are required for each taxonomic category for identification purposes.~~ ← { family ← genus ← species

Some other means of recording description :

(They help in correct identification)

FLORA

Actual account of habitat & distribution of plants of a given area.

These provide index to plant species found in a particular area.

MANUALS

Providing information for identification of names of species found in an area.

MONOGRAPHIES

Contains information on any one taxon.
Studies by taxonomists prepared